

**Amendments to the Claims:**

This listing of Claims will replace all prior versions and listings of Claims in the Application.

**Listing of Claims:**

Claims 1-12

Claim 13 (currently amended): An electrolyte solution for a metal-oxygen battery where oxygen is reduced at a cathode surface to produce  $O^{2-}$  or  $O_2^{2-}$  ions, the electrolyte comprising:

a lithium salt selected from the group consisting of  $LiPF_6$ ,  $LiBF_4$ ,  $LiClO_4$ ,  $LiC(SO_2CF_3)_3$ ,  $LiN(SO_2CF_3)_2$ ,  $LiO_3SCF_2CF_3$ ,  $LiO_3SC_6F_5$ ,  $LiO_2CCF_3$ ,  $LiP(C_6H_5)_4$ ,  $LiCF_3SO_3$ ; and

a non-aqueous solvent comprises a material selected from the group consisting of dimethyl ~~carbonante~~ carbonate (DMC), dipropyl carbonate (DPC), diethyl carbonate (DEC), ethyl methyl carbonate (EMC), tetrahydrofuran (THF), and 1,2-dimethoxyethane (DME), wherein the oxygen solubility of the solvent is at least 0.1150 cc  $O_2$ /cc  $O_2$ /cc at STP.

Claim 14 (currently amended): A metal-oxygen battery where oxygen is reduced at a cathode to produce  $O^{2-}$  or  $O_2^{2-}$  ions, the battery comprising:

a ~~lithium~~ metal-containing anode;

a cathode for reducing the oxygen; and

an electrolyte solution of a lithium salt selected from the group consisting of LiPF<sub>6</sub>, LiBF<sub>4</sub>, LiClO<sub>4</sub>, LiC(SO<sub>2</sub>CF<sub>3</sub>)<sub>3</sub>, LiN(SO<sub>2</sub>CF<sub>3</sub>)<sub>2</sub>, LiO<sub>3</sub>SCF<sub>2</sub>CF<sub>3</sub>, LiO<sub>3</sub>SC<sub>6</sub>F<sub>5</sub>, LiO<sub>2</sub>CCF<sub>3</sub>, LiP(C<sub>6</sub>H<sub>5</sub>)<sub>4</sub>, LiCF<sub>3</sub>SO<sub>3</sub>; and

a non-aqueous solvent for the electrolyte selected from the group consisting of dimethyl carbonate carbonate (DMC), dipropyl carbonate (DPC), diethyl carbonate (DEC), ethyl methyl carbonate (EMC), tetrahydrofuran (THF), and 1,2-dimethoxyethane (DME), wherein the oxygen solubility of the solvent is at least 0.1150 cc O<sub>2</sub>/cc O<sub>2</sub>/cc at STP.

Claim 15 (currently amended): The metal-oxygen battery of claim 14, wherein the ~~electro-active~~ cathode comprises carbon.

Claim 16 (currently amended): A lithium-oxygen battery where oxygen is reduced at a cathode to produce O<sup>-2</sup> or O<sub>2</sub><sup>-2</sup> ions which react with lithium to produce Li<sub>2</sub>O<sub>2</sub>, that deposit on the cathode, the battery comprising:

a lithium metal-containing anode;

a cathode for reducing oxygen; ~~and~~

an electrolyte solution of a lithium salt selected from the group consisting of LiPF<sub>6</sub>, LiBF<sub>4</sub>, LiClO<sub>4</sub>, LiC(SO<sub>2</sub>CF<sub>3</sub>)<sub>3</sub>, LiN(SO<sub>2</sub>CF<sub>3</sub>)<sub>2</sub>, LiO<sub>3</sub>SCF<sub>2</sub>CF<sub>3</sub>, LiO<sub>3</sub>SC<sub>6</sub>F<sub>5</sub>, LiO<sub>2</sub>CCF<sub>3</sub>, LiP(C<sub>6</sub>H<sub>5</sub>)<sub>4</sub>, LiCF<sub>3</sub>SO<sub>3</sub>; and

a non-aqueous solvent for the electrolyte selected from the group consisting of dimethyl carbonate carbonate (DMC), dipropyl carbonate (DPC), diethyl carbonate

(DEC), ethyl methyl carbonate (EMC), tetrahydrofuran (THF), and 1,2-dimethoxyethane (DME), wherein the oxygen solubility of the solvent is at least 0.1150 cc  $\text{O}_2/\text{cc}$   $\text{O}_2/\text{cc}$  at STP.

Claim 17 (currently amended): The ~~metal-oxygen~~ lithium-metal battery of claim 14, 17 wherein the cathode comprises carbon.

Claim 18 (new): An electrolyte solution for a metal-oxygen battery where oxygen is reduced at a cathode surface to produce  $\text{O}^{-2}$  or  $\text{O}_2^{-2}$  ions, the electrolyte comprising:

a lithium salt selected from the group consisting of  $\text{LiPF}_6$ ,  $\text{LiBF}_4$ ,  $\text{LiClO}_4$ ,  $\text{LiC}(\text{SO}_2\text{CF}_3)_3$ ,  $\text{LiN}(\text{SO}_2\text{CF}_3)_2$ ,  $\text{LiO}_3\text{SCF}_2\text{CF}_3$ ,  $\text{LiO}_3\text{SC}_6\text{F}_5$ ,  $\text{LiO}_2\text{CCF}_3$ ,  $\text{LiP}(\text{C}_6\text{H}_5)_4$ ,  $\text{LiCF}_3\text{SO}_3$ ; and

a non-aqueous solvent further comprising a combination of propylene carbonate and at least one of a material selected from the group consisting of dimethyl carbonate (DMC), dipropyl carbonate (DPC), diethyl carbonate (DEC), ethyl methyl carbonate (EMC), tetrahydrofuran (THF), and 1,2-dimethoxyethane (DME), wherein the oxygen solubility of the solvent is at least 0.1150 cc  $\text{O}_2/\text{cc}$  at STP.

Claim 19 (new): A metal-oxygen battery where oxygen is reduced at a cathode to produce  $\text{O}^{-2}$  or  $\text{O}_2^{-2}$  ions, the battery comprising:

a metal-containing anode;

a cathode for reducing the oxygen;

an electrolyte solution of a lithium salt selected from the group consisting of LiPF<sub>6</sub>, LiBF<sub>4</sub>, LiClO<sub>4</sub>, LiC(SO<sub>2</sub>CF<sub>3</sub>)<sub>3</sub>, LiN(SO<sub>2</sub>CF<sub>3</sub>)<sub>2</sub>, LiO<sub>3</sub>SCF<sub>2</sub>CF<sub>3</sub>, LiO<sub>3</sub>SC<sub>6</sub>F<sub>5</sub>, LiO<sub>2</sub>CCF<sub>3</sub>, LiP(C<sub>6</sub>H<sub>5</sub>)<sub>4</sub>, LiCF<sub>3</sub>SO<sub>3</sub>; and

a non-aqueous solvent further comprising a combination of propylene carbonate and at least one of a material selected from the group consisting of dimethyl carbonate (DMC), dipropyl carbonate (DPC), diethyl carbonate (DEC), ethyl methyl carbonate (EMC), tetrahydrofuran (THF), and 1,2-dimethoxyethane (DME), wherein the oxygen solubility of the solvent is at least 0.1150 cc O<sub>2</sub>/cc at STP.

Claim 20 (new): The A metal-oxygen battery of claim 19 wherein the metal-containing anode is a lithium metal-containing anode.

Claim 21 (new): An electrolyte solution for a metal-oxygen battery where oxygen is reduced at a cathode surface to produce O<sup>-2</sup> or O<sub>2</sub><sup>-2</sup> ions, the electrolyte comprising:

a lithium salt selected from the group consisting of LiPF<sub>6</sub>, LiBF<sub>4</sub>, LiClO<sub>4</sub>, LiC(SO<sub>2</sub>CF<sub>3</sub>)<sub>3</sub>, LiN(SO<sub>2</sub>CF<sub>3</sub>)<sub>2</sub>, LiO<sub>3</sub>SCF<sub>2</sub>CF<sub>3</sub>, LiO<sub>3</sub>SC<sub>6</sub>F<sub>5</sub>, LiO<sub>2</sub>CCF<sub>3</sub>, LiP(C<sub>6</sub>H<sub>5</sub>)<sub>4</sub>, LiCF<sub>3</sub>SO<sub>3</sub>; and

a non-aqueous solvent further comprising a combination of  $\gamma$ -butyrolactone ( $\gamma$ -BL) and at least one of a material selected from the group consisting of dimethyl carbonate (DMC), dipropyl carbonate (DPC), diethyl carbonate (DEC), ethyl methyl carbonate (EMC), tetrahydrofuran (THF), and 1,2-dimethoxyethane (DME), wherein the oxygen solubility of the solvent is at least 0.1150 cc O<sub>2</sub>/cc at STP.

Claim 22 (new): An electrolyte solution for a metal-oxygen battery where oxygen is reduced at a cathode surface to produce  $O^{2-}$  or  $O_2^{2-}$  ions, the electrolyte comprising:

a lithium salt selected from the group consisting of  $LiPF_6$ ,  $LiBF_4$ ,  $LiClO_4$ ,  $LiC(SO_2CF_3)_3$ ,  $LiN(SO_2CF_3)_2$ ,  $LiO_3SCF_2CF_3$ ,  $LiO_3SC_6F_5$ ,  $LiO_2CCF_3$ ,  $LiP(C_6H_5)_4$ ,  $LiCF_3SO_3$ ; and

a non-aqueous solvent further comprising a combination of dimethyl sulfoxide (DMSO) and at least one of a material selected from the group consisting of dimethyl carbonate (DMC), dipropyl carbonate (DPC), diethyl carbonate (DEC), ethyl methyl carbonate (EMC), tetrahydrofuran (THF), and 1,2-dimethoxyethane (DME), wherein the oxygen solubility of the solvent is at least 0.1150 cc  $O_2$ /cc at STP.

Claim 23 (new): An electrolyte solution for a metal-oxygen battery where oxygen is reduced at a cathode surface to produce  $O^{2-}$  or  $O_2^{2-}$  ions, the electrolyte comprising:

a lithium salt selected from the group consisting of  $LiPF_6$ ,  $LiBF_4$ ,  $LiClO_4$ ,  $LiC(SO_2CF_3)_3$ ,  $LiN(SO_2CF_3)_2$ ,  $LiO_3SCF_2CF_3$ ,  $LiO_3SC_6F_5$ ,  $LiO_2CCF_3$ ,  $LiP(C_6H_5)_4$ ,  $LiCF_3SO_3$ ; and

a non-aqueous solvent further comprising a combination of N-methyl pyrrolidinone (NMP) and at least one of a material selected from the group consisting of dimethyl carbonate (DMC), dipropyl carbonate (DPC), diethyl carbonate (DEC), ethyl methyl carbonate (EMC), tetrahydrofuran (THF), and 1,2-dimethoxyethane (DME), wherein the oxygen solubility of the solvent is at least 0.1150 cc  $O_2$ /cc at STP.

Claim 24 (new): An electrolyte solution for a metal-oxygen battery where oxygen is reduced at a cathode surface to produce  $O^{2-}$  or  $O_2^{2-}$  ions, the electrolyte comprising:

a lithium salt selected from the group consisting of  $LiPF_6$ ,  $LiBF_4$ ,  $LiClO_4$ ,  $LiC(SO_2CF_3)_3$ ,  $LiN(SO_2CF_3)_2$ ,  $LiO_3SCF_2CF_3$ ,  $LiO_3SC_6F_5$ ,  $LiO_2CCF_3$ ,  $LiP(C_6H_5)_4$ ,  $LiCF_3SO_3$ ; and

a non-aqueous solvent further comprising a combination of tetraethylene glycol dimethyl ether and at least one of a material selected from the group consisting of dimethyl carbonate (DMC), dipropyl carbonate (DPC), diethyl carbonate (DEC), ethyl methyl carbonate (EMC), tetrahydrofuran (THF), and 1,2-dimethoxyethane (DME), wherein the oxygen solubility of the solvent is at least 0.1150 cc  $O_2$ /cc at STP.

Claim 25 (new): An electrolyte solution for a metal-oxygen battery where oxygen is reduced at a cathode surface to produce  $O^{2-}$  or  $O_2^{2-}$  ions, the electrolyte comprising:

a lithium salt selected from the group consisting of  $LiPF_6$ ,  $LiBF_4$ ,  $LiClO_4$ ,  $LiC(SO_2CF_3)_3$ ,  $LiN(SO_2CF_3)_2$ ,  $LiO_3SCF_2CF_3$ ,  $LiO_3SC_6F_5$ ,  $LiO_2CCF_3$ ,  $LiP(C_6H_5)_4$ ,  $LiCF_3SO_3$ ; and

a non-aqueous solvent further comprising a combination of triethylene glycol dimethyl ether and at least one of a material selected from the group consisting of dimethyl carbonate (DMC), dipropyl carbonate (DPC), diethyl carbonate (DEC), ethyl methyl carbonate (EMC), tetrahydrofuran (THF), and 1,2-dimethoxyethane (DME), wherein the oxygen solubility of the solvent is at least 0.1150 cc  $O_2$ /cc at STP.